Earth Science Data and Information System (ESDIS) Project

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DAAC Users Working Group

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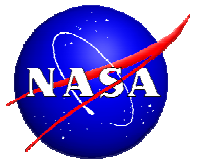
Earth Observing System Data and Information System (EOSDIS)

The EOSDIS is continually evolving to meet increasing workload and shorter latency requirements; leverage new information technologies; and improve support to a broad user community.

Recent improvements to the system include:

- Transition to a fully on-line data archive
- Network performance enhancements
- Functional and performance enhancements to ECHO
- Expanded near-real-time capabilities
- Increased collaboration among DAACs
- Many new science data sets

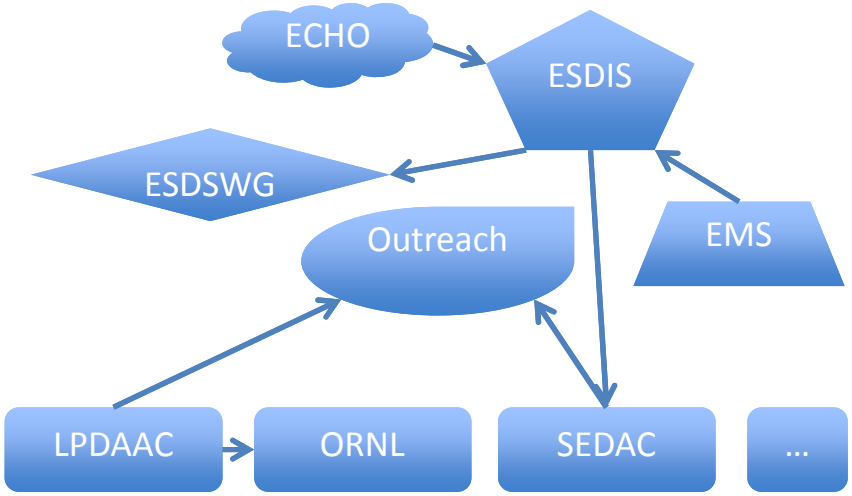
What's Up!!



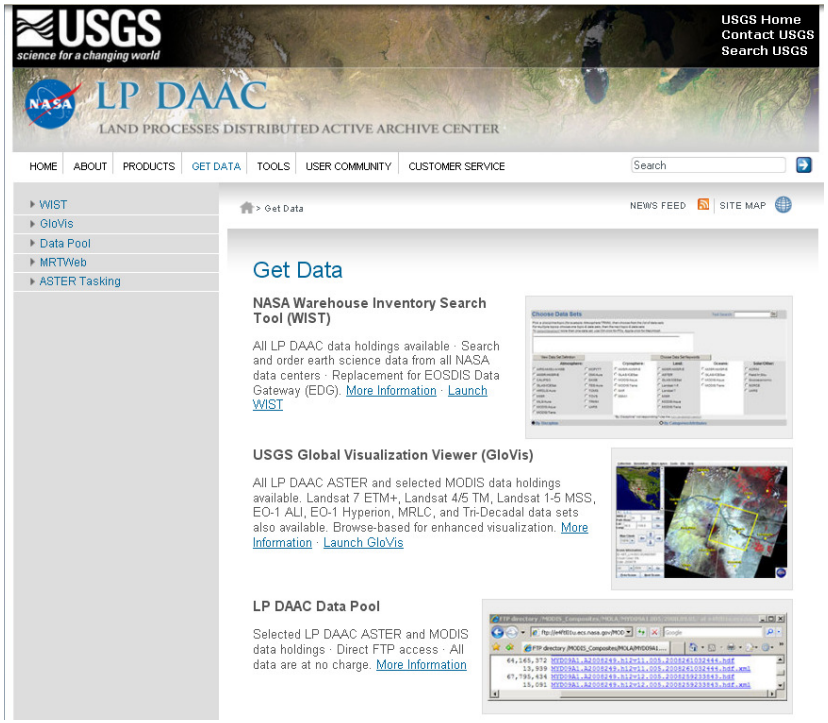
- Technology Infusion
  - Consolidated Level 2 Swath Search and Subsetting Web services
  - SAR Data Accessibility Enhancements
  - Satellite Coincident Search Engine
  - Simple Subset Wizard
- Upgrades to LANCE near real time systems and additional products
- Distribution and management of MEaSURES datasets as they mature
- Enhanced WIST (ECHO client called Reverb) to go operational in June 2011
- Enhanced ECHO Ingest API to allow ingest of ISO 19115 & other metadata in Mar 2011
- Uniform user registration system being developed and implemented in phases across DAACs. LP DAAC will play a critical role.
- Developing a coherent Web presence for EOSDIS data services
- Advance planning science system support for NPP, Ventures, Decadal Survey missions

New Web Services

- Reverb, and upgraded WIST, will become the general purpose web search client for EOSDIS data
  - Beta release soon, public in June
  - Deceases turnaround speeds using a REST-type interface with ECHO
  - Access to ECHO holding 3,092 Collections, with 87 million Granules, and 57 million Browse
- Develop a coherent web presence for the Earth Science Data System Project from top-to-bottom (HQ-EOSDIS-DAACs)
  - Better represent EOSDIS capabilities
  - Have data centers more clearly represented as elements of a larger system

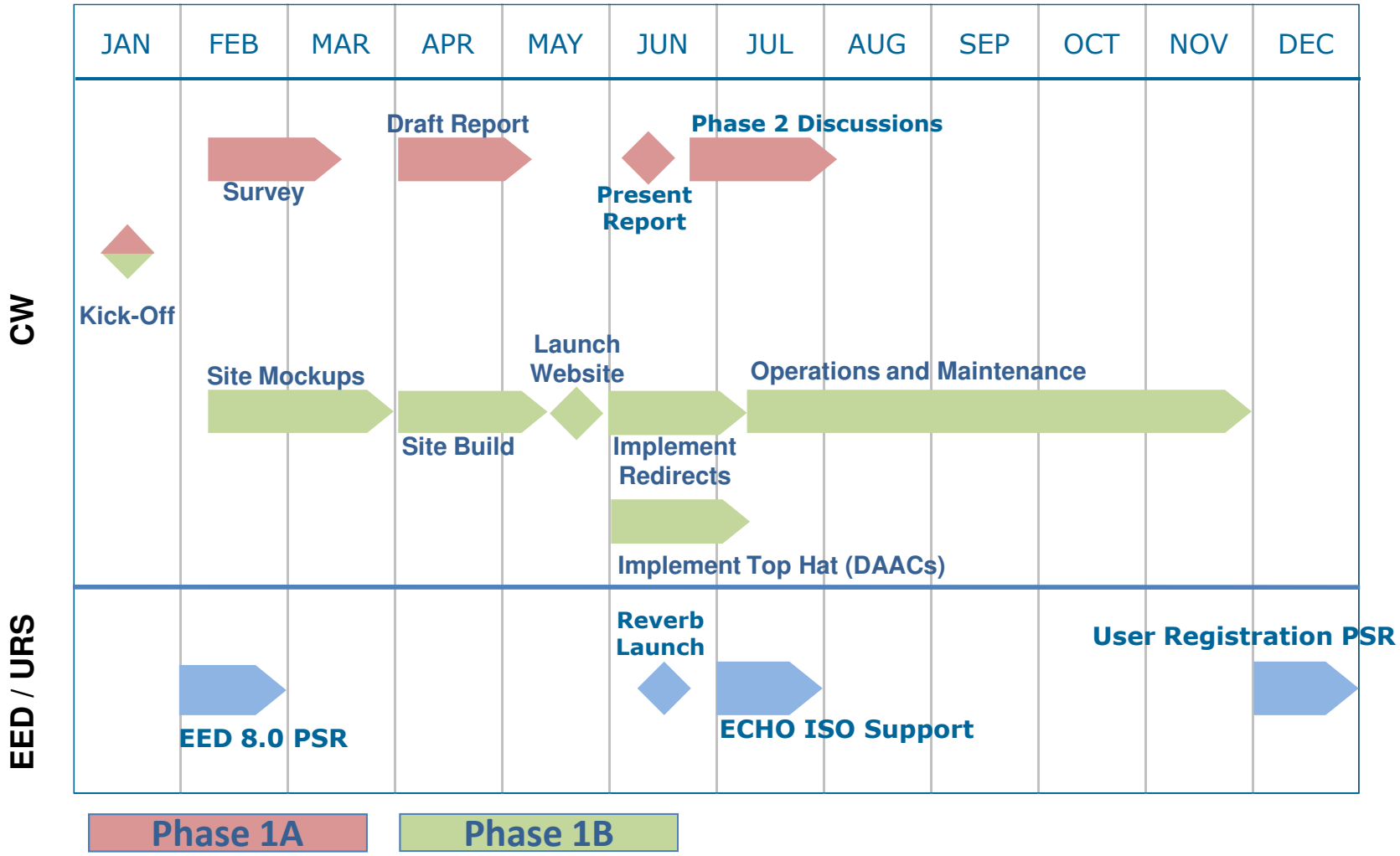


Access from EOSDIS Data Centers

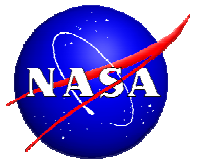


Data Access is available from the EOSDIS Data Center web sites.

Web – 2011 Timeline



Expanding EOSDIS Near Real-time support

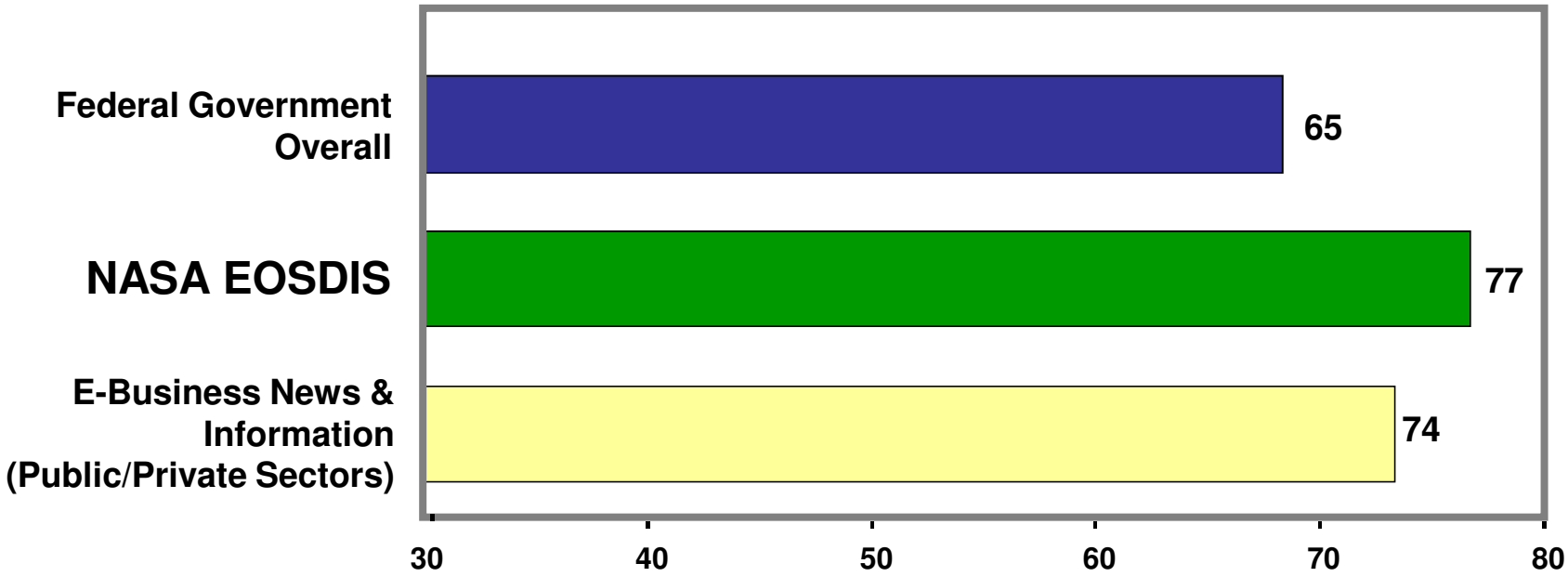


LANCE (Land, Atmosphere Near-real-time Capability for EOS)

- Builds on existing EOSDIS elements
- Data from MODIS, OMI, AIRS, MLS, and AMSR-E instruments in near real-time (< 3 hours from observation)
- 92 products available across all instruments
- High operational availability
- Applications of LANCE data include:
  - Numerical weather & climate prediction/forecasting
  - Monitoring of Natural Hazards
  - Disaster Relief
  - Agriculture
  - Air quality
  - Homeland Security
- Over 150 users access data from LANCE on a regular basis

EOSDIS ACSI Customer Satisfaction Survey 2010: Relative Rankings

- EOSDIS sponsors an annual independent customer survey in conjunction with the American Customer Satisfaction Index (ACSI).
- EOSDIS consistently exceeds the Federal Government average
- Ratings in the mid to upper 70s are considered "very good" by the rating organization, the CFI Group
- 2010 Survey results based on 4380 responses (7%)



LP DAAC showed significant increase to score 76 based on 377 responses
ORNL DAAC score also increased by one to 78 based on 185 responses

Product Quality

Preferences in line with actual for the most part

Format data products were provided		Format preferred	
HDF-EOS/HDF	57%	HDF-EOS/HDF	42%
NetCDF	11%	NetCDF	18%
Binary	10%	Binary	13%
ASCII	18%	ASCII	24%
GeoTIFF	36%	GeoTIFF	49%
JPEG, GIF, PNG, TIFF	14%	JPEG, GIF, PNG, TIFF	18%
OGC Web services	1%	OGC Web services	3%
GIS	8%	GIS	19%
KML, KMZ	4%	KML, KMZ	11%
CEOS	2%	CEOS	2%
Don´t know	3%	OPeNDAP	2%
Other format	2%	Other preferred format	3%
Number of Respondents	**4,038**	**Number of Respondents**	**4,038**

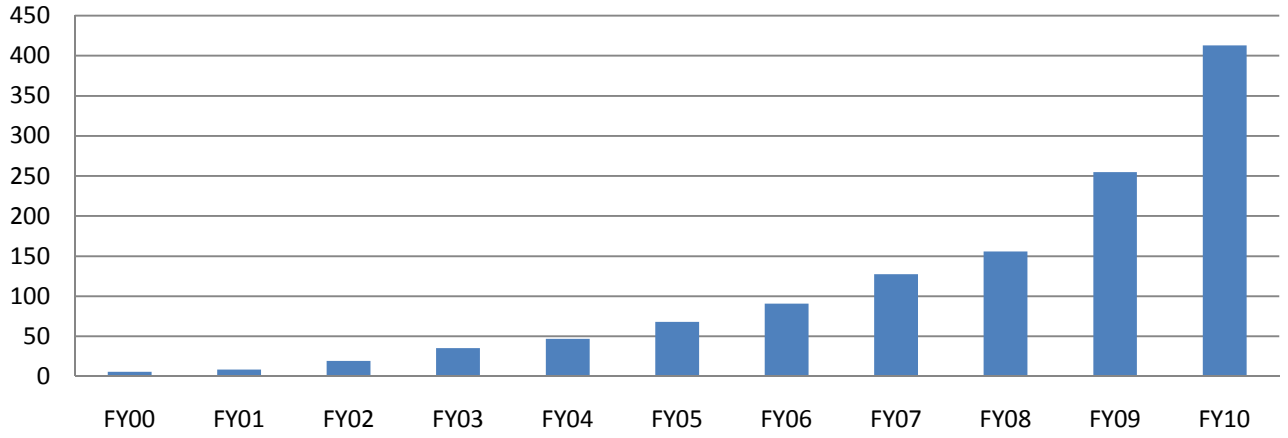
**Multiple responses allowed*

EOSDIS Key Metrics

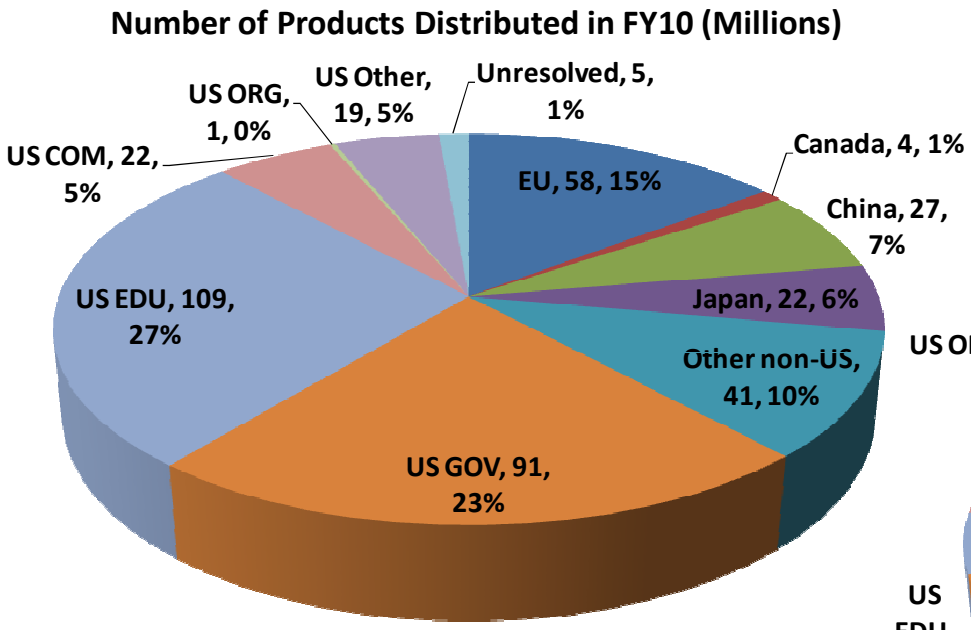
FY10 Metrics	EOSDIS	LP DAAC	ORNL
Unique Data Products	> 4200	306	923
Distinct Users of EOSDIS Data and Services	> 1.1M	~42,000	~26,000
Web Site Visits of 1 Minute or more	> 1.1M	~35,000	~18,000
Average Daily Archive Growth	2.9 TB/day	.19 TB/day	.01 TB/day
Total Archive Volume	4.5 PB	~820 TB	~0.4 TB
End User Distribution Products	> 412M	52M	50M
End User Average Daily Distribution Volume	9.9 TB/day	2.6 TB/day	0.01 TB/day

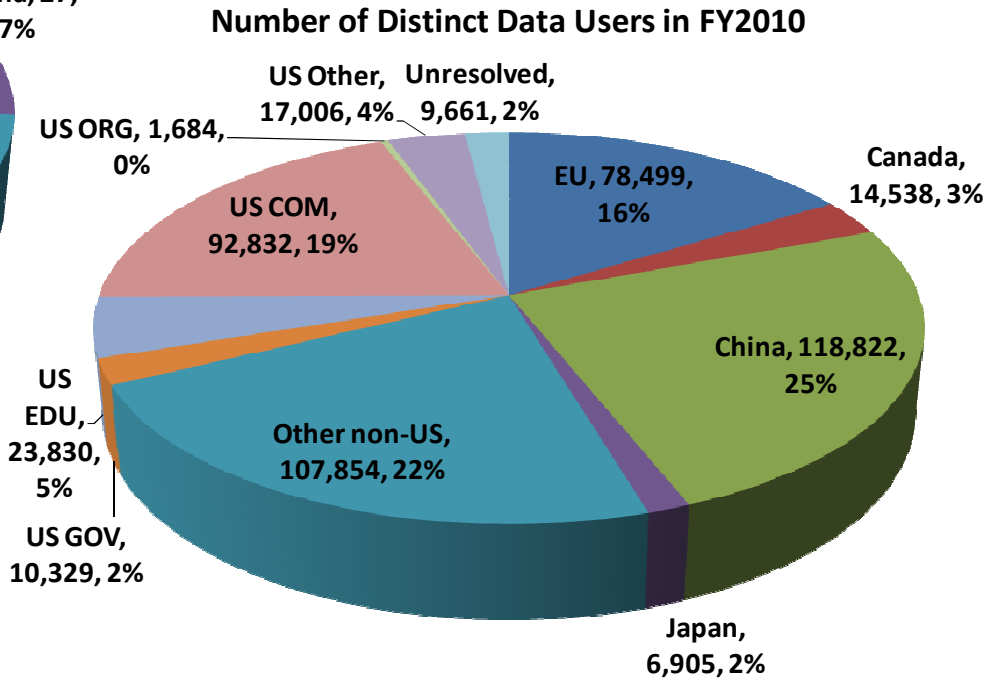
ESDIS Project Supports		
Science System Elements	Data Centers	12
	SIPS	14
Interfaces	Interface Control Documents	32
Partnerships	US	8
	International	13
Missions	Science Data Processing	10
	Archiving and Distribution	38
	Instruments Supported	87

EOSDIS Products Delivered (Millions)



EOSDIS Data Distribution In FY2010





LP DAAC Product Distribution Activity FY05/FY10

	Terra MODIS			Aqua MODIS			ASTER		
	FY05	FY10	Increase	FY05	FY10	Increase	FY05	FY10	Increase
Product Distribution (1000s)	10,512	28,606	2.7 X	1,296	19,623	15 X	429	3,310	8 X
Users	4,048	13,940	3.4 X	1,160	6,967	6 X	4,535	8,808	2 X

% MODIS	FY05	FY10
Product Distribution	89%	59%
Users	78%	67%

FY05	FY10
11%	41%
22%	33%

% Total	FY05	FY10
Product Distribution	70%	55%
Users	33%	45%

FY05	FY10
9%	38%
10%	22%

FY05	FY10
3%	6%
37%	28%

- **ASTER and MODIS (Terra and Aqua) show a dramatic increase in products distributed and # of data users**
- **Aqua shows an increasing percentage of the MODIS distribution**
- **LP DAAC distributed about 3M files of ASTER GDEM (ASTGTM) in both FY2009 and FY2010**

ORNL DAAC Product Distribution Activity FY05/FY10

	Terra MODIS			Aqua MODIS			Field Experiments		
	FY05	FY10	Increase	FY05	FY10	Increase	FY05	FY10	Increase
Product Distribution (1000s)	0	48,169	na	0	712	na	487	1,002	2 X
Data Users	0	4,246	na	0	1,606	na	5,406	13,281	2.5 X

% MODIS	FY05	FY10
Product Distribution	0%	99%
Data Users	0%	73%

FY05	FY10
0%	1%
0%	27%

% Total	FY05	FY10
Product Distribution	0%	97%
Data Users	0%	22%

FY05	FY10
0%	1%
0%	8%

FY05	FY10
100%	2%
100%	69%

- MODIS distribution began in FY2008
- Field Experiment product distribution and data users doubled since FY2005
- In FY2010 MODIS dominates product distribution at 98%
  - serving 30% of the data users; 99% is MODIS Terra, 1 % is MODIS Aqua

MODIS distribution by LP DAAC and ORNL

FY2010 MODIS Product Distribution

LP DAAC		ORNL	
Terra MODIS	**Aqua MODIS**	**Terra MODIS**	**Aqua MODIS**
22.3 GB/1K	**14.6 GB/1K**	**.07 GB/1K**	**1.5GB/1K**
2,000 Products/user	**2,800 Products/user**	**11,300 Products/user**	**440 Products/user**

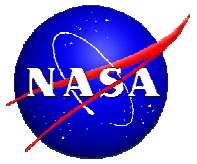
- The average product size (GB) distributed by ORNL is much smaller than by LP DAAC (data subsetting)
- On average, each Terra MODIS data user at ORNL receives significantly more products

Cross DAAC data users

- From FY05 to FY10 the number of data users of both DAACs increased from 63 to 462
  - LP DAAC: from 0.8% to 2.1% of total users
  - ORNL: from 1.2% to 2.7% of total users
- Increase in cross DAAC data users coincides with ORNL MODIS data subsetting

	FY05	FY06	FY07	FY08	FY09	FY10
# of Users who retrieve data from both LP DAAC and ORNL	63	69	52	54	362	462
# of LP DAAC Users	8,309	8,619	8,996	8,295	18,345	22,168
# of ORNL Users	5,406	6,298	8,961	7,068	14,939	16,805
% of LP DAAC Users	0.8%	0.8%	0.6%	0.7%	2.0%	2.1%
% of ORNL Users	1.2%	1.1%	0.6%	0.8%	2.4%	2.7%

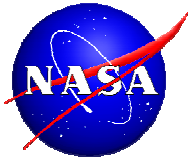
Cross DAAC activity



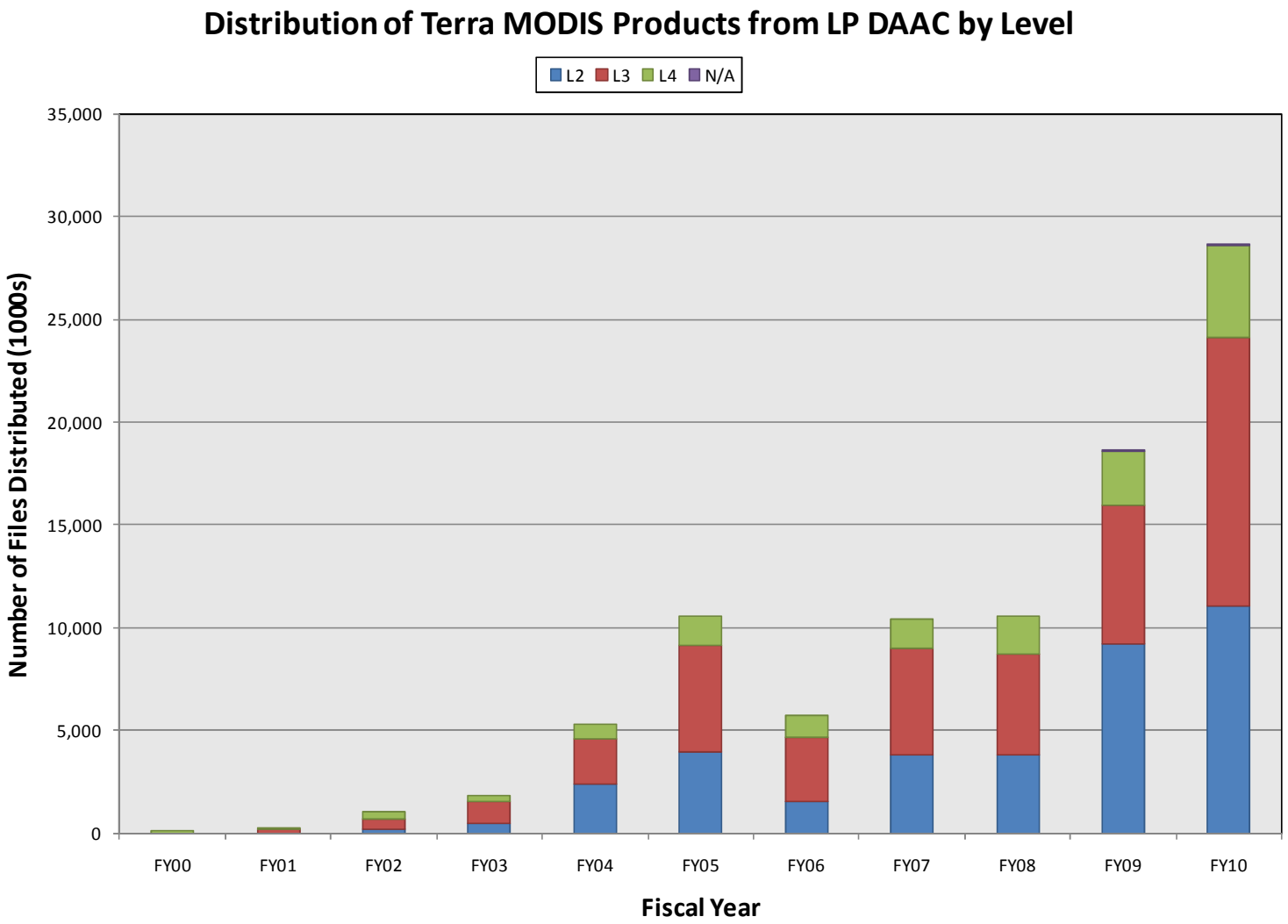
- The #1 product at LP DAAC by number of data users is MOD13 - Gridded Vegetation Indices (NDVI & EVI) [16,788 users]
  - 106 of these users also received MOD13 from ORNL
  - And 20 or more of these users accessed additional MODIS products (Terra, Aqua or combined) from ORNL:

Product	#	Description
MOD11	69	Land Surface Temperature and Emissivity
MOD15	61	Leaf Area Index (LAI) and Fractional Photosynthetically Active Radiation (FPAR)
MOD09	50	Surface Reflectance; Atmospheric Correction Algorithm Products
MOD17	40	Vegetation Production, Net Primary Productivity (NPP
MYD13	33	Aqua MODIS Enhanced Vegetation Index
MCD43	30	MODIS Bidirectional Reflectance Distribution Function (BRDF)/Albedo Product (combined)
MCD12	25	Land Cover (combined)
MYD09	20	Aqua Surface Reflectance; Atmospheric Correction Algorithm Products
MYD17	20	Aqua Vegetation Production, Net Primary Productivity (NPP

Backup



LP DAAC MODIS Distribution by Level



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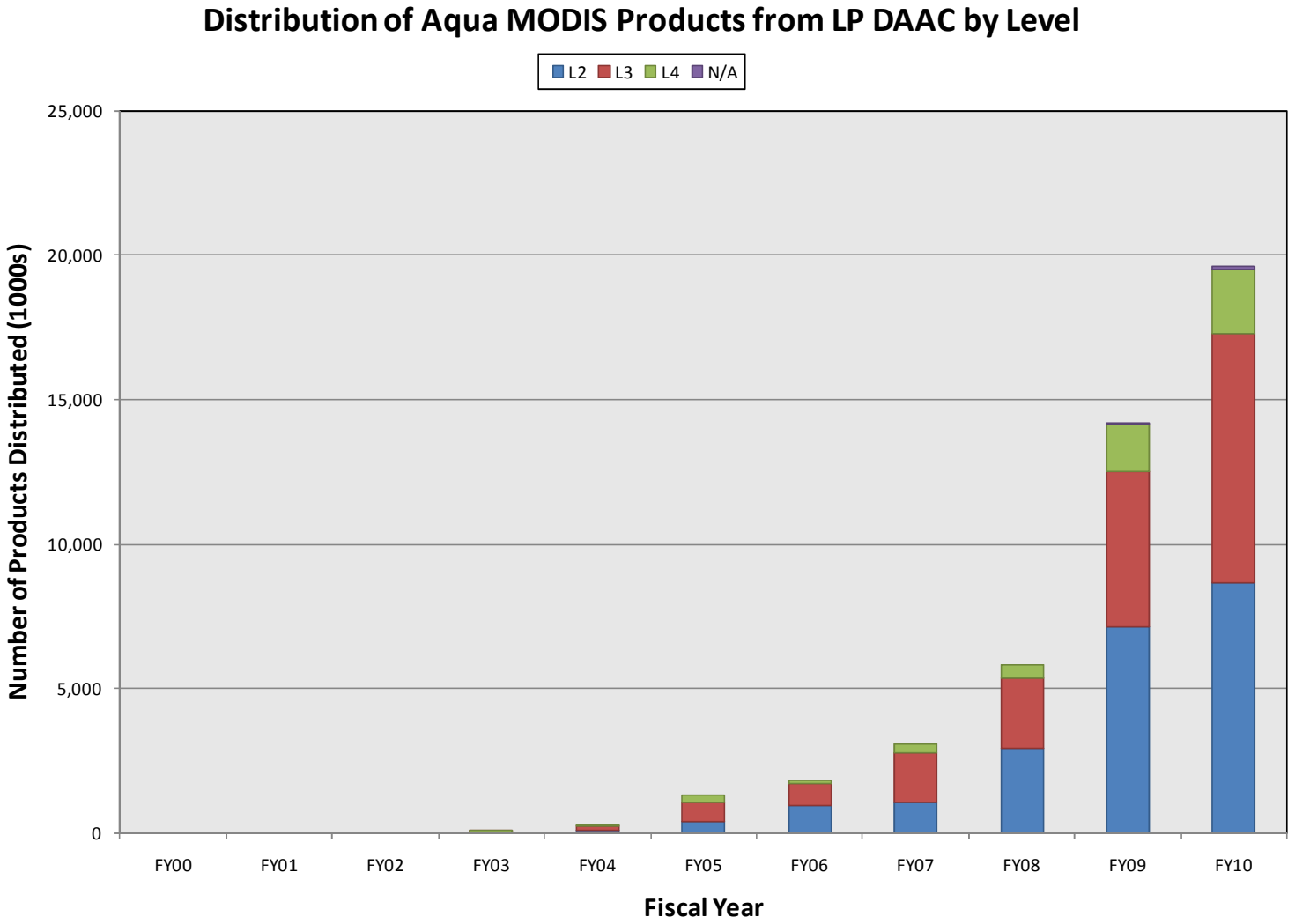
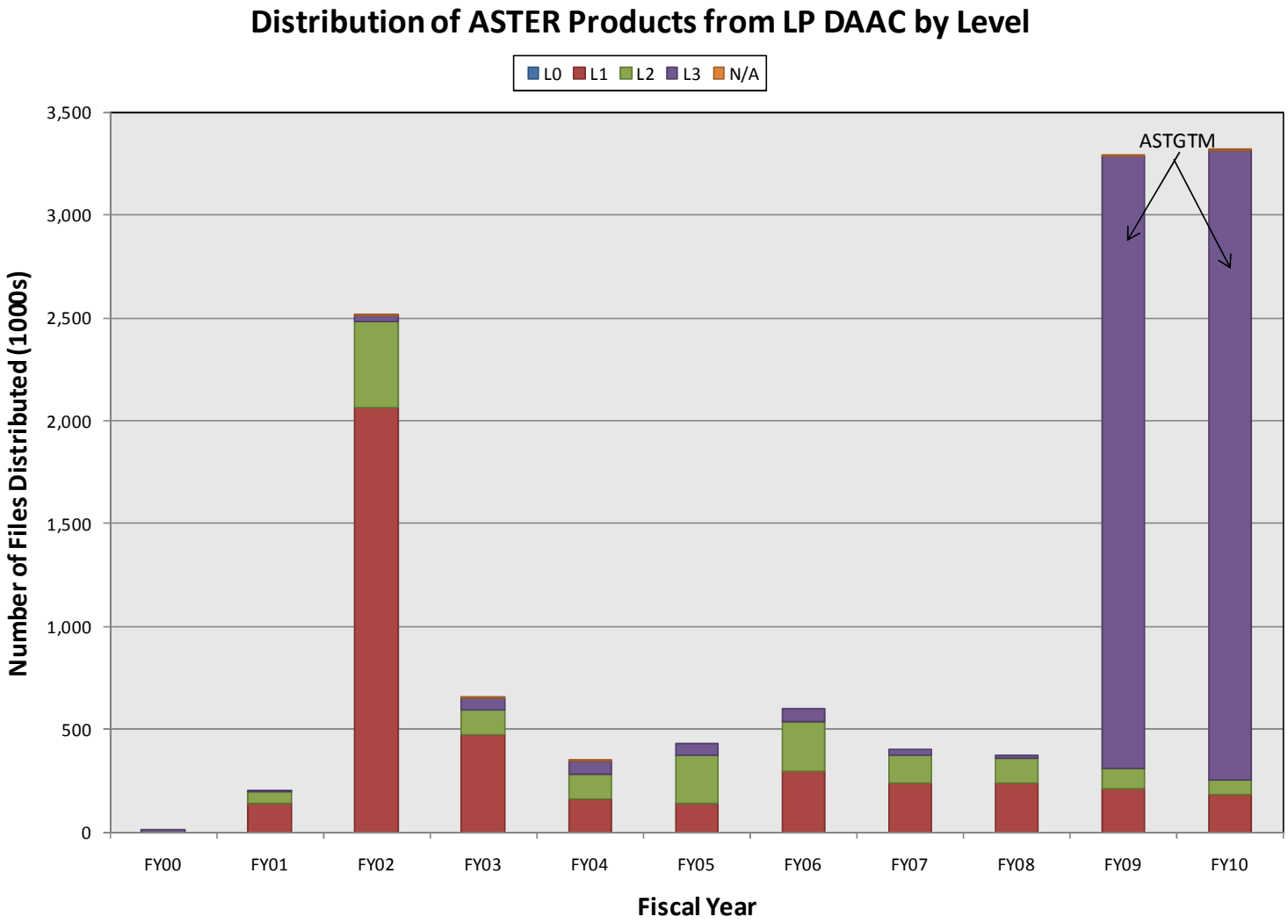
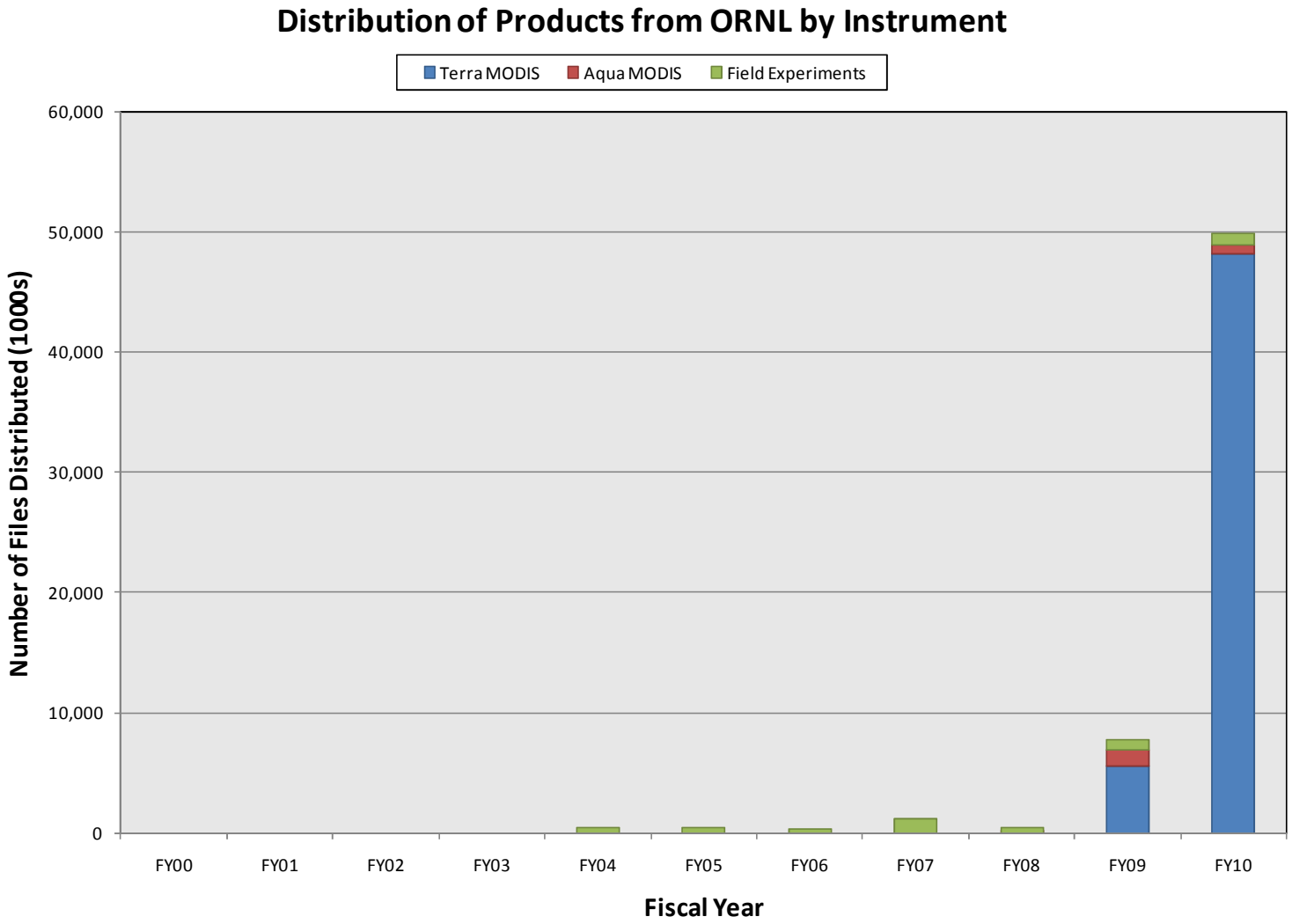


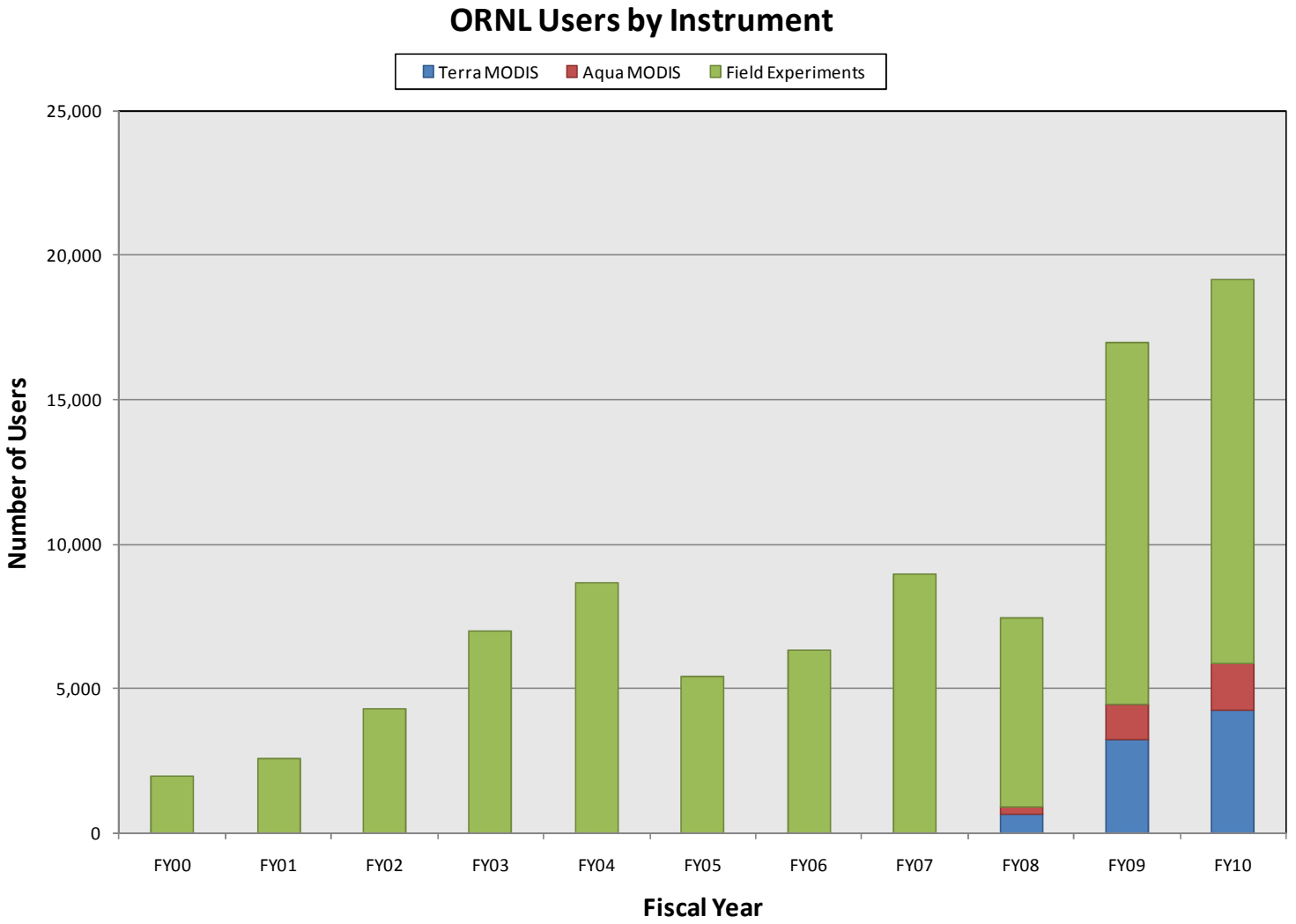
ASTER's Increase in Distribution driven by ASTER Global Digital Elevation Model (GDEM)



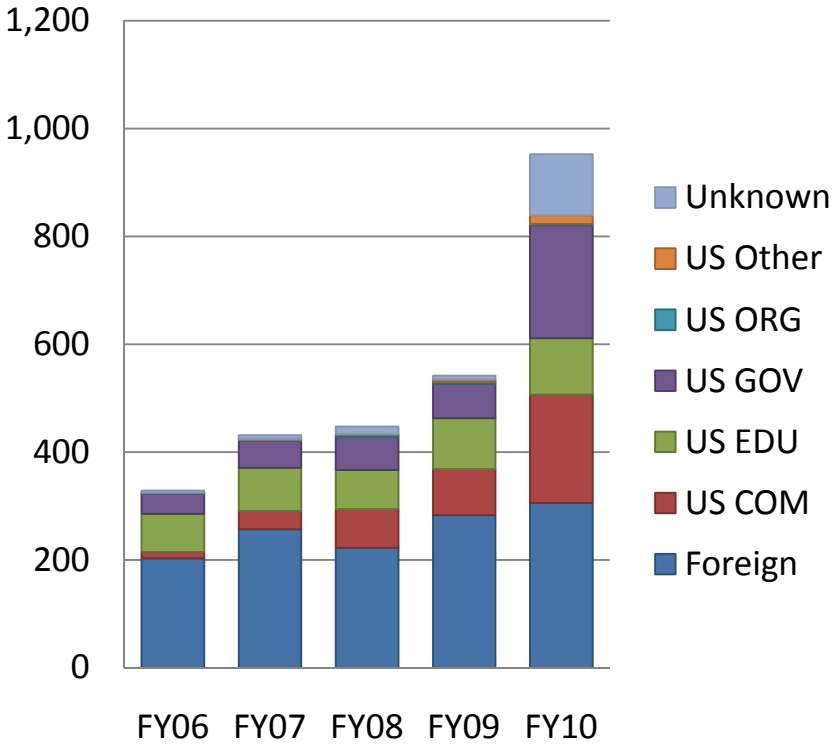
MODIS subsets bumps up ORNL distribution



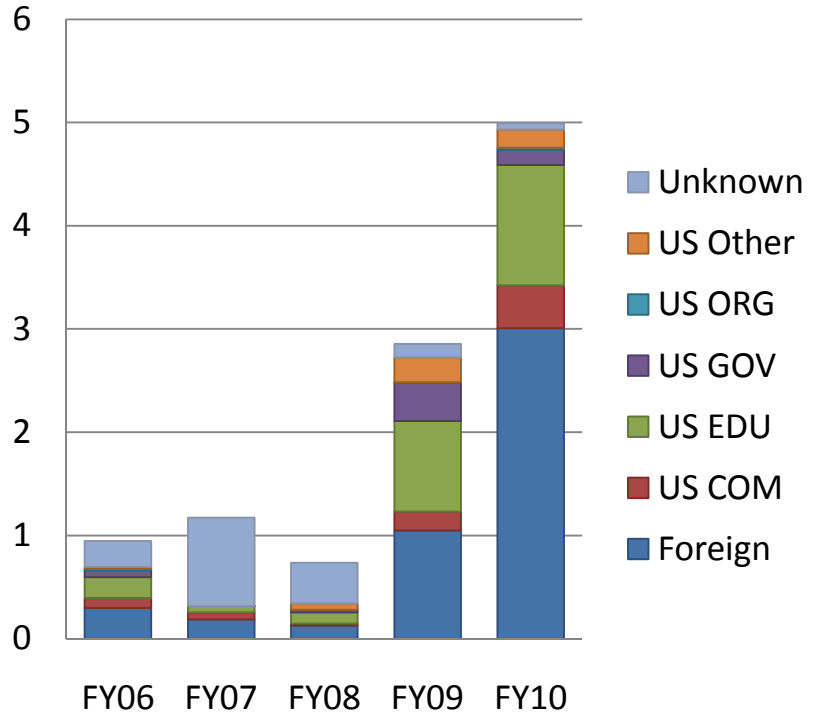
ORNL data users



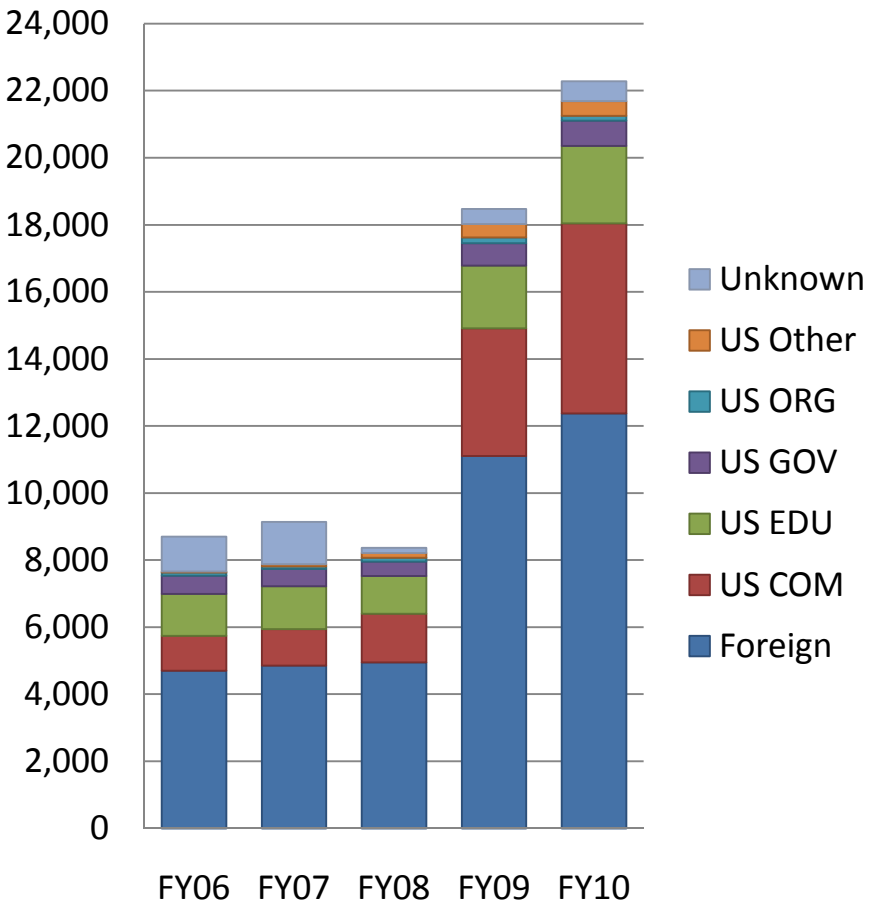
Volume (TB) of Products Distributed from LP DAAC by Domain



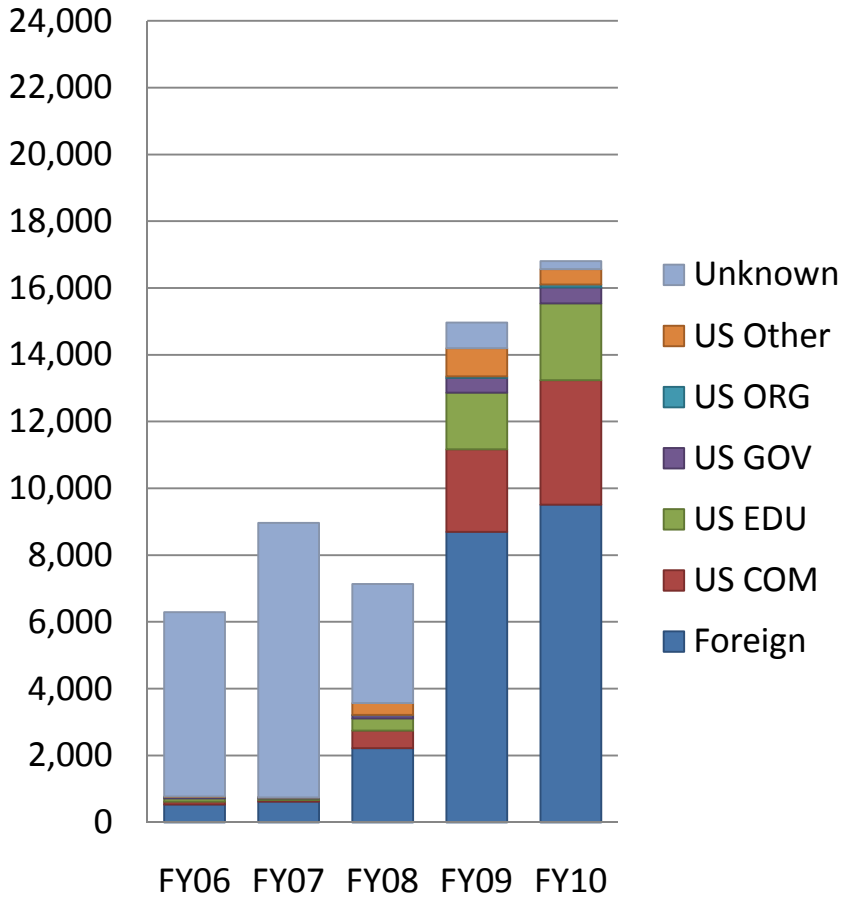
Volume (TB) of L2-L4 Products Distributed from ORNL by Domain



LP DAAC Users by Domain

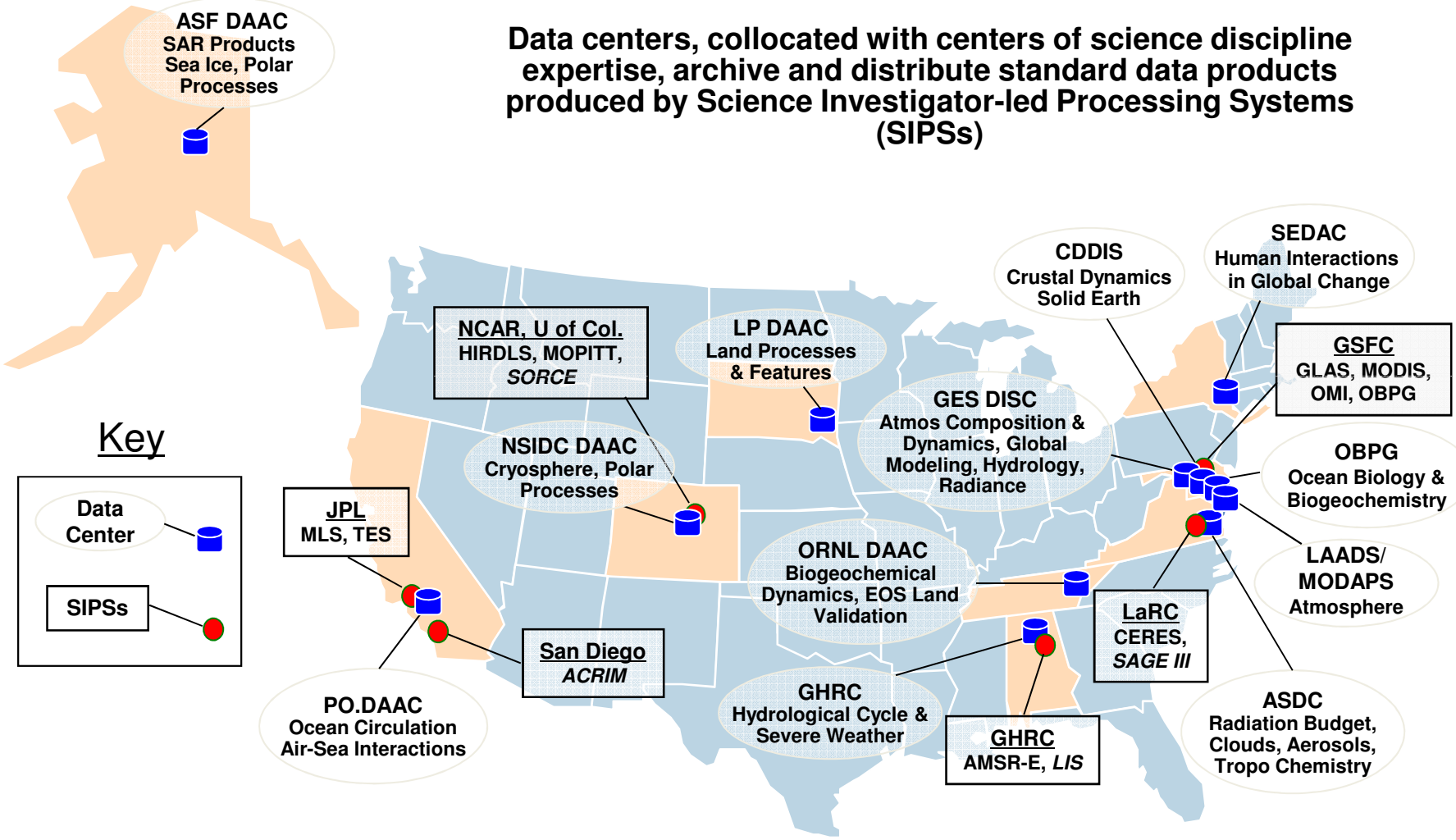


ORNL Users by Domain

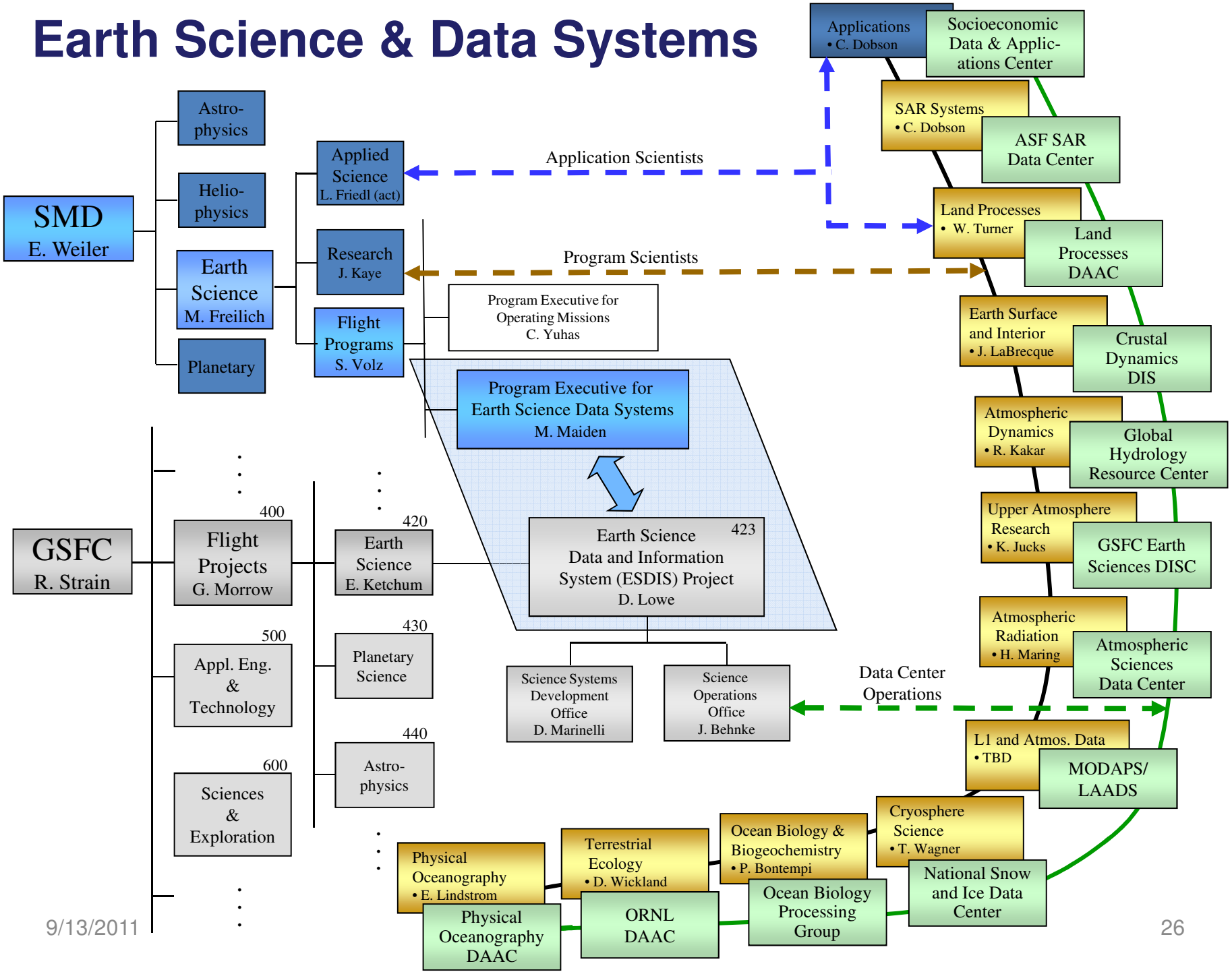


EOSDIS Facilities

Data centers, collocated with centers of science discipline expertise, archive and distribute standard data products produced by Science Investigator-led Processing Systems (SIPSs)



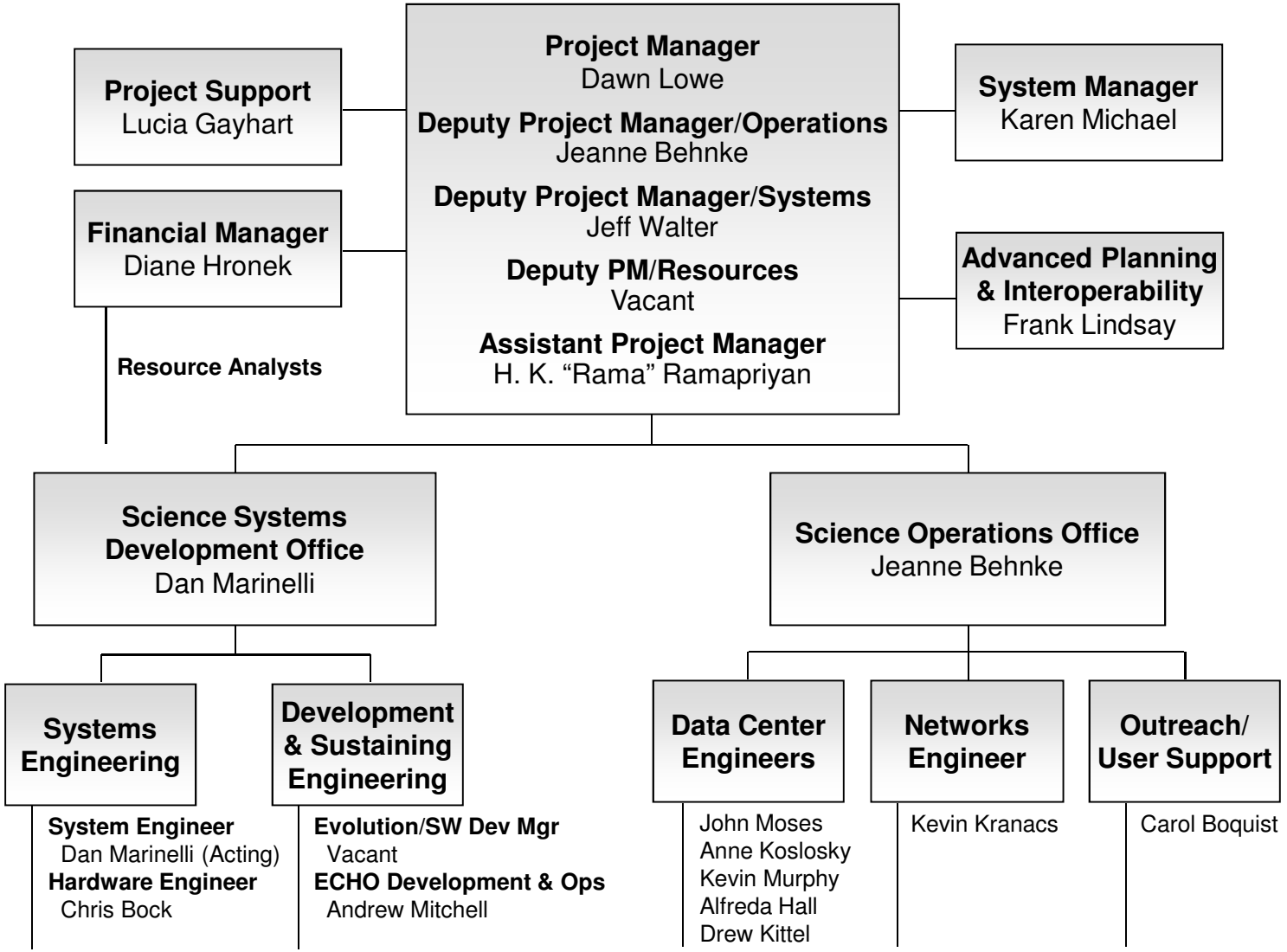
Earth Science & Data Systems



DAAC User Working Groups

- Members represent discipline interests of the diverse user community.
- Purpose of the UWGs are:
  - provide guidance on DAAC data management priorities and science goals
  - provide oversight and guidance on DAAC activities, including data set acquisition, development of value-added products, user support, development activities, and operational functions
  - provide recommendations for annual work plans and long-range planning

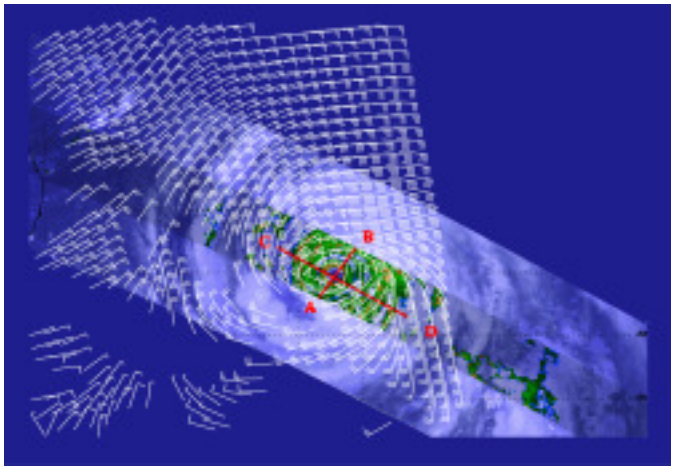
ESDIS Project



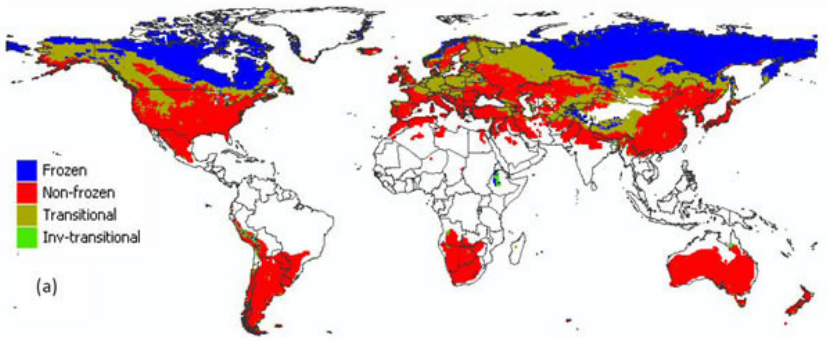
New Data Sets: MEaSUREs

- MEaSUREs (Making Earth System data records for Use in Research Environments)
  - Developments
  - Already available at EOSDIS DAACs:

Cross-Calibrated Multi-Platform Ocean Surface Wind Velocity Data Set	**PO. DAAC**
Goddard Satellite-based Surface Turbulent Fluxes (GSSTF) Data Set for Global Water and Energy Cycle Research	**GES DISC**
Global Record of Daily Landscape Freeze/Thaw Status	**NSIDC**
Greenland Ice Sheet Velocity Map from InSAR data	**NSIDC /ASF**



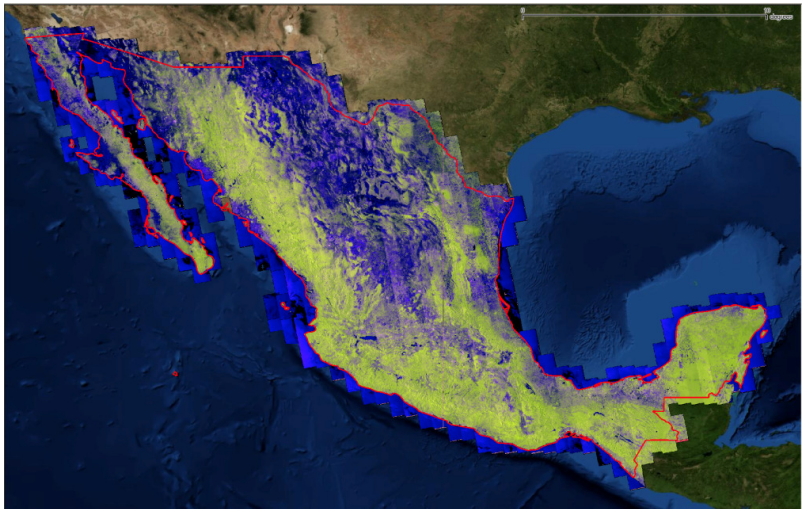
Ocean Surface Wind Velocity Dataset/PO.DAAC



Freeze/Thaw Status at NSIDC

New Data Sets: ALOS PALSAR via NASA TDRSS

- PALSAR (Phased Array L-band Synthetic Aperture Radar) provides all-weather, day and night land observations. ScanSAR mode is useful for measuring sea ice and rain forest extent.
- NASA downlinks data via TDRSS Ka-Band from JAXA's ALOS to support NASA and JAXA research efforts.
- By combining NASA and JAXA data-relay satellite resources, coverage of North and South America nearly doubles.
- Over 51 Tbytes data now available from ASF Data pool.

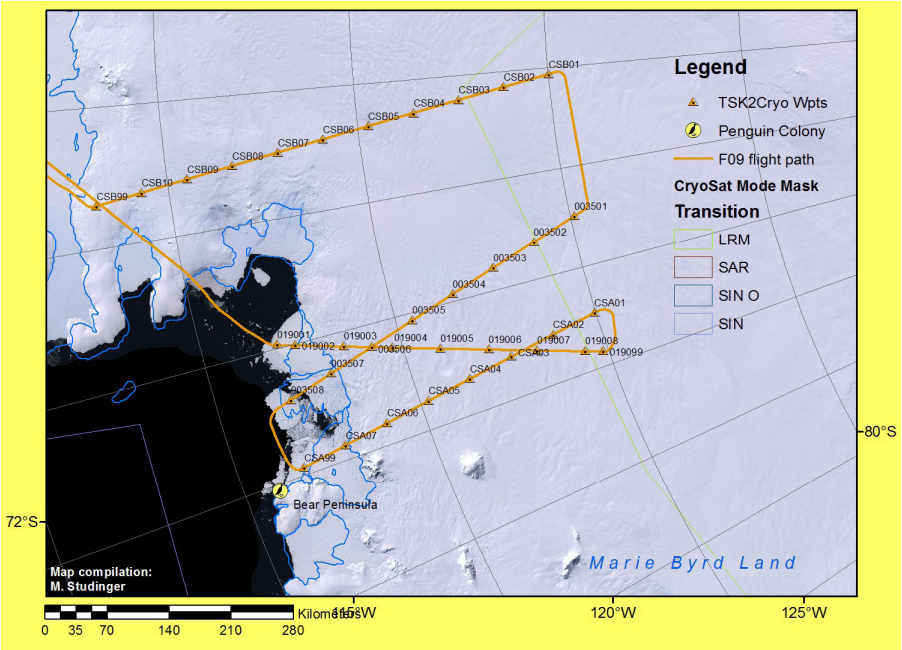


Mapping Mexico with ALOS PALSAR via TDRS/ASF DAAC
P.I. Josef Kellndorfer, The Woods Hole Research Center

- The **Pan-Tropical Mapping project** worked jointly with Mexico's ground data network of 40,000 permanent survey plots to generate a forest-cover product from JAXA's ALOS PALSAR data, acquired via TDRSS Ka-band services.

New Data Sets: IceBridge

- A 6-yr NASA airborne mission over Greenland and Antarctica
  - Cover gap between ICESat and ICESat-2; support CryoSat cal/val
- Archive and distribution of IceBridge products managed by NSIDC DAAC.
- 2009-2010 Greenland and Antarctica Campaign Data
  - Several data product types available online
  - Access will grow to include more than 20 major instrument types
  - All data will eventually be available within months of the campaign – immediately after



Flight path of 11/19/2010 low-altitude survey of two ICESat and two CryoSat ground tracks; a partial repeat of the 10/18/2009 IceBridge flight.